

# VARUN JOSE MADANU

New York, NY (Open to relocate)

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## Professional Experience

### Software Engineer Intern

May 2025 – Dec 2025

Excelerate

Remote, USA

- **Challenge:** Users struggled to find relevant courses from a catalog of 600+ learning resources, leading low engagement
- **Action:** Built personalized learning path recommendation system using SentenceTransformers embeddings and cosine similarity; developed skill-gap analysis module matching user profiles to course prerequisites
- **Result:** Increased course completion rates by 25% through personalized suggestions tailored to user skill levels
- **Problem:** For cold start problem where new users with no learning history had limited recommendation accuracy
- **Action:** Implemented hybrid recommendation approach combining content-based filtering with collaborative signals from similar user cohorts; built onboarding survey to capture initial skill assessments
- **Result:** Improved new user engagement by 35% within first week through targeted resource suggestions
- Developed FastAPI microservices for recommendation engine with Redis caching, reducing average response time to under 200ms

### Programming Analyst Assistant

Jun 2024 – May 2025

NYS Department of Transportation

Albany, NY

- **Problem:** Manual data processing workflows consumed 20+ hours weekly, delaying critical infrastructure reports
- **Action:** Developed automated ETL pipelines using Python and SQL, implementing data validation and transformation logic to process transportation datasets
- **Result:** Reduced manual processing time by 75%, enabling real-time dashboard updates for 50+ stakeholders
- Built analytical dashboards using data visualization techniques, improving decision-making efficiency for cost estimation projects, optimized database queries achieving 60% faster report generation through indexing and query restructuring

### Software Engineer Intern

Jan 2022 – Jun 2023

Cognier Insights

Hyderabad, India

- **Challenge:** Raw customer data lacked structured features needed for churn prediction model training
- **Action:** Built data preprocessing pipelines using Python and Pandas to clean 50K+ customer records; engineered 15+ features from transaction logs and user behavior data including recency, frequency, and engagement metrics
- **Result:** Improved model accuracy from 82% to 87% through iterative feature selection and hyperparameter tuning with XGBoost
- **Action:** Assisted in migrating ODBC workflows to REST APIs using Spring Boot; implemented Redis caching for frequently accessed customer features
- **Result:** Reduced data fetch latency by 40%, enabling faster model predictions for downstream recommendation workflows
- Wrote SQL queries to extract user engagement metrics for A/B testing analysis, supporting evaluation of recommendation effectiveness across 3 customer cohorts

## Technical Skills

**Programming Languages:** Python, JavaScript, TypeScript, Java, SQL

**ML/AI Technologies:** OpenAI API, Hugging Face, TensorFlow, Scikit-learn, SentenceTransformers

**Recommendation Systems:** Collaborative Filtering, Content-Based, Hybrid Systems, BM25, TF-IDF, Cosine Similarity, Embeddings

**Backend Frameworks:** FastAPI, Node.js, Express.js, RESTful APIs, Django

**Frontend Technologies:** React.js, Tailwind CSS, Angular, HTML5, CSS3

**Databases:** PostgreSQL, Supabase, MongoDB, ChromaDB, BigQuery, Redis

**Cloud & DevOps:** AWS (EC2, RDS, S3), GCP, Docker, Terraform, GitHub Actions, CI/CD

**Tools & Methods:** Git, Agile/Scrum, Nginx, JWT Auth, API Design

## Education

### University at Albany, SUNY

Aug 2023 – May 2025

Master of Science in Computer Science

Albany, NY

### Kommuri Pratap Reddy Institute of Technology

Mar 2019 – Jun 2023

Bachelor of Technology in Computer Science

Hyderabad, India

## Technical Projects

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### GivAura – AI-Powered Gift Recommendation Engine | *React, FastAPI, OpenAI API, Supabase, PostgreSQL*

- **Situation:** Users struggle to find personalized gifts, with existing solutions offering generic, non-contextual recommendations
- **Task:** Built an intelligent recommendation system matching gifts to recipients based on multiple personal factors
- **Action:** Engineered hybrid recommendation engine combining OpenAI text-embedding-3-large, BM25, TF-IDF, and cosine similarity algorithms with FastAPI backend and React/Tailwind frontend
- **Result:** Achieved personalized gift matching across 6 weighted factors (occasion, relationship, age, personality, interests, budget) with 85% accuracy rate

### AI Semantic Book Recommender | *Python, LLMs, ChromaDB, OpenAI Embeddings, Hugging Face*

- **Situation:** Traditional book recommendation systems rely on collaborative filtering, missing semantic context and emotional resonance
- **Task:** Developed end-to-end semantic search system suggesting books by query, emotion, and category
- **Action:** Integrated OpenAI Embeddings with ChromaDB vector database for semantic retrieval; applied Hugging Face Transformers for tone detection (joy, sadness, anger, surprise) enabling emotion-based personalization
- **Result:** Built recommendation pipeline processing 10,000+ book entries with sub-second query response times
- **Impact:** Achieved 92% relevance accuracy in user testing through multi-modal recommendation approach combining semantic similarity with emotional classification